

REMARKS

Claims 6 and 8 are amended, no claims are canceled, and claim 94 is added; as a result, claims 1-6, 8-10, 12, 14, 15, 18-23, 31-36, 38-46, and 75-94 are now pending in the above-identified patent application. Claims 15, 18-23, 31-36, 38-46, and 75-93 were withdrawn from consideration by the Examiner.

In the Office Action Summary, checkbox 4 indicates that claims 75-92 are pending in the application, and at checkbox 4a that claims 75-92 are withdrawn from consideration. Applicant submits that claim 93 is both pending and withdrawn from consideration in the present application, and respectfully requests a correction regarding the status of claim 93 in the next office communication.

Claim 8 was not amended to overcome a rejection based on prior art, but was amended to correct an antecedent basis issue. Specifically, the word "material" was amended to read "materials." No new matter was added through this amendment.

Support for new claim 94 can be found throughout the specification. For example, support can be found in the specification on page 4 at lines 21-25, and on page 8, line 18 through page 5, line 4. No new matter is added as a result of adding new claim 94.

§112 Rejection of the Claims

Claims 10, 12, and 14 were rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. Applicant respectfully traverses the rejection of claims 10, 12, and 14.

The Office Action on page 2 asserts that the language of claim 10 - "a non-structural component" - is unclear because "the terms 'non-structural' and/or 'component' appear to be given meanings repugnant to their usual meaning," and further, "the structure imparts to the component by the term 'non-structural' cannot be determined." Applicant respectfully disagrees, and directs the Examiner's attention to the specification on page 4, lines 17-25, which states,

Material layer 106 includes a structural component, such as ribbed structure 109, and a non-structural component, such as fill material 112. An advantage of using a structural component in the present invention is that the structural component is easily modified to support flip-chip mounting or silicon on substrate mounting of electronic chip 103, without interfering with the layout of the air-bridge structures. Ribbed structure

109 is designed to support the entire weight of electronic chip 103, if electronic chip 103 is mounted using a C4 or flip-chip interconnect.

In addition, new claim 94 recites, "The integrated circuit assembly of claim 1, wherein the electronic chip is a flip chip." Therefore, it is clear from the disclosure in the specification and the claims that in one or more embodiments, the structural component of claim 10 serves to provide support for a flip chip. Further, the specification on page 5 at lines 1-6 states,

Fill material 112 is a non-structural component, and in one embodiment, is a polymer, such as a photoresist or a polyimide. Preferably, fill material 112 is carbon, which has a vaporization temperature of about 400 degrees centigrade, and is deposited in interstices 116 or the etched areas of ribbed structure 109 by sputtering. Fill material 112 is patterned and etched to form a template for the vertical wiring vias and the horizontal interconnect paths of conductive structure 115.

Therefore, the claim language related to "non-structural component" is supported by and can clearly be determined from the language of the specification. Further, the claim language is not given a meaning repugnant to their usual meaning, as asserted by the Office Action.

The Office Action on page 2 also states, "To further clarify, the terms 'non-structural' and 'component' appear to be incompatible because the component is inherently structural." Applicant disagrees, and since the Office Action points to no reference in support of the assertion that the component is inherently structural, Applicant assumes that the Office Action is taking official notice with respect to "the component is inherently structural." Applicant traverses the taking of official notice and requests that the Examiner provide a reference that describes "the component is inherently structural." If the Examiner cannot provide such a reference, Applicant requests that the Examiner submit an affidavit as required by MPEP § 2144.03. If the Examiner cannot provide an affidavit, Applicant requests withdrawal of the rejection and reconsideration and allowance of claims 10, 12, 14.

For at least the reasons stated above, Applicant submits that the rejection under 35 U.S.C. § 112 second paragraph has been overcome, and therefore respectfully requests withdrawal of the rejection and reconsideration and allowance of claims 10, 12, and 14.

§102 Rejection of the Claims

Claims 1, 5, 6, 8-10, 12, and 14 were rejected under 35 U.S.C. § 102(e) for anticipation by Juengling *et al.* (U.S. Patent 6,333,556). Applicant does not admit that Juengling *et al.* is

prior art and reserves the right, as provided for under 37 C.F.R. § 1.131, to "swear behind" Juengling *et al.* at a later date. Applicant respectfully traverses the rejection of claims 1, 5, 6, 8-10, 12, and 14.

"For a prior art reference to anticipate a claim, the reference must disclose each and every element of the claim with sufficient clarity to prove its existence in the prior art . . . Although this disclosure requirement presupposes the knowledge of one skilled in the art of the claimed invention, that presumed knowledge does not grant a license to read into the prior art reference teachings that are not there." *Motorola, Inc. v. Interdigital Tech. Corp.*, 43 USPQ2d 1481, 1490 (Fed. Cir. 1997).

Claims 1, 6, and 10 recite, "an electronic chip." In contrast, Juengling *et al.* at column 3, lines 16-19 recites, "Semiconductor wafer fragment 10b comprises a substrate 12b, and conductive elements 14b, 16b and 18b overlying substrate 12b," and further at column 3, lines 20-22 recites, "Substrate 12b may comprise, for example, an insulative layer over a semiconductor substrate." (emphasis added in both instances) Hence, Juengling *et al.* fails to teach "an electronic chip" as recited in each of claims 1, 6, and 10.

The Office Action on pages 3 and 4 relies on element 12b of Juengling *et al.* as disclosing "an electronic chip 12b" and "chip 12b." Applicant disagrees for several reasons. As noted above, Juengling *et al.* refers to 12b as a "substrate" and not as a "chip" and not as an "electronic chip." Applicant has performed an electronic search of the Juengling *et al.* document, and the word "chip" does not appear anywhere in the document.

The Office Action on page 4 states, "to further clarify the disclosure of a chip 12b, a chip is defined as, 'a small usually thin and flat piece (as of wood or stone) cut, struck, or flaked off: 'chip.' *Merriam-Webster Online Dictionary*. 2004, <http://www.merriam-webster.com> (15 Jan. 2005)." Applicant submits the same website defines chip "as a small thin slice of food *especially* : POTATO CHIP," and as "one of the counters used as a token for money in poker and other games" and as "a piece of dried dung -- usually used in combination <cow chip>," (*Merriam-Webster Online Dictionary*. 2004, <http://www.merriam-webster.com> (April 14, 2005)), all of which are equally inapplicable to the recitation of "an electronic chip" in claims 1, 6, and 10. Definiteness of claim language must be analyzed, not in a vacuum, but in light of: (1) The content of the particular application disclosure; (2) The teachings of the prior art; and (3) The

claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. *M.P.E.P.* § 2173.02. The Applicant's disclosure in the specification on page 4, lines 6-12 states,

Integrated circuit assembly 100 is not limited to use in connection with a particular type of electronic chip 103. Memory chips, such as a dynamic random access memory (DRAM) chips, static random access memory (SRAM) chips, read-only-memory (ROM) chips, and random access memory (RAM) chips, microprocessor chips, logic chips, digital signal processing chips, analog signal processing chips, and application specific integrated circuit (ASIC) chips can all be used in connection with integrated circuit assembly 100.

Further and as noted above, one or more embodiments of the present invention include an assembly including a flip chip.

Based on the content of the particular application disclosure, the definition proposed on page 4 of the Office Action fails to meet the requirements as set forth in *M.P.E.P.* § 2173.02, and therefore is improperly applied in the interpretation of the claim language of claims 1, 6, and 10. Thus, the Office Action's definition of element 12b of Juengling *et al.* as "a chip" fails to teach "an electronic chip" as recited in claims 1, 6, and 10.

For at least the reasons stated above, Juengling *et al.* fails to teach each of the elements of claims 1, 6, and 10. Thus, the Office Action fails to state a *prima facie* case of anticipation with respect to claims 1, 6, and 10.

Claim 5 is dependent on claim 1. Claims 8-9 are dependent on claim 6. Claims 12 and 14 are dependent on claim 10. For reasons analogous to those provided above and additional elements in the claims, Applicant respectfully submits that the Office Action fails to state a *prima facie* case of anticipation with respect to claims 5, 8-9, 12, and 14.

Therefore, Applicant respectfully requests withdrawal of the rejections and reconsideration and allowance of claims 1, 5, 6, 8-10, 12, and 14.

§103 Rejection of the Claims

Claims 1-6, 8-10, 12, and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sun (U.S. Patent 6,350,672) and Murata *et al.* (U.S. Patent 5,268,587). Applicant does not admit that Sun is prior art and reserves the right, as provided for under 37

C.F.R. § 1.131, to "swear behind" Sun at a later date. Applicant respectfully traverses the rejection of claims 1-6, 8-10, 12, and 14.

The Office Action must provide specific, objective evidence of record for a finding of a teaching, suggestion, or motivation to combine reference teachings and must explain the reasoning by which the evidence is deemed to support such a finding. *In re Sang Su Lee*, 277 F.3d 1338 (Fed. Cir. 2002). Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP § 2143. The Examiner must avoid hindsight. *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990).

The Office Action, in an attempt to meet these requirements, on page 6 states, "Moreover, it would have been obvious to combine this disclosure of Murata with the disclosure of Sun because it would enable manufacture of a DRAM and reduce the migration phenomenon in the aluminum conductive structure of Sun," and further, "it would have been obvious to combine this disclosure of Murata with the disclosure of Sun because it would facilitate provision of the silicon oxide of Sun." Applicant disagrees with these statements. Sun does not appear to concern "manufacture of a DRAM" or "reduction of the migration phenomenon in aluminum conductive structure" or "provision of the silicon oxide," and so the statements in the Office Action are merely conclusory statements based on impermissible hindsight. Because these statements fail to meet the standards as set forth above, the Office Action has failed to state a *prima facie* case of obviousness with respect to Claims 1-6, 8-10, 12, and 14.

In addition, even assuming *arguendo* that Sun and Murata *et al.* could be combined, the Office Action fails to state a *prima facie* case of obviousness with respect to claims 1-6, 8-10, 12, and 14 because the combination proposed does not include all of the elements of the claims. For example, claim 1 recites, "a conductive structure embedded in a material layer having a plurality of vaporization temperatures," claim 6 as amended recites, "wherein each of the plurality of materials contacts a surface of the electronic chip," and claim 10 recites, "a conductive structure embedded in a material layer having a structural component having a structural vaporization temperature and a non-structural component having a non-structural vaporization temperature less than the structural vaporization temperature."

In contrast, Sun at column 5, lines 42-45 recites, "The interlayer dielectric 62 is then covered with a layer of carbon deposited, for example, in a high density plasma CVD (HDPCVD) process using a CH₄ or C₂H₂ source gas." Further, at column 6, lines 12-16 Sun recites, "Next, an oxide layer 70 is deposited over the recessed carbon structures 68 and the first level wiring lines 66 so that the oxide layer extends partially down the sides of each of the first level wiring lines 66." Hence, Sun recites two layers, a "carbon layer" and an "oxide layer" and therefore fails to teach or suggest a conductive structure embedded in a material layer as recited in claims 1 and 10. Further, the oxide layer in Sun is deposited over the recessed carbon structures and wiring lines, and so Sun fails to teach or suggest "wherein each of the plurality of materials contacts a surface of the electronic chip" as recited in amended claim 6.

Applicant cannot find where Murata *et al.* teaches or suggests these elements as recited in claims 1, 6, and 10, and that are not found in the principal applied document Sun. Therefore, Applicant submits that neither Sun nor Murata *et al.*, either alone or in combination, teach or suggest each of the elements of claims 1, 6, and 10. Hence the Office Action has failed to state a *prima facie* case of obviousness with respect to claims 1, 6, and 10.

Claims 2-5 are dependent on claim 1. Claims 8-9 are dependent on claim 6. Claims 12 and 14 are dependent on claim 10. Therefore, dependent claims 2-5, 8-9, 12, and 14 include all the elements of the independent claim from which they depend, including those as noted above that are not disclosed by the proposed combination of Sun and Murata *et al.* In addition, dependent claims 2-5, 8-9, 12, and 14 include additional elements that are distinguishably patentable. For example, claim 2 recites an electronic chip is a memory chip, claim 3 recites a dynamic random access memory chip, and claim 4 recites a conductive structure is fabricated from copper. The Office Action admits that Sun does not disclose these elements, and Applicant agrees. Further, the Office Action on page 6 admits that Sun does not verbatim disclose silicon dioxide, as recited in dependent claims 8 and 12. The Office Action relies on Murata *et al.* as supplying these elements. However, the fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP § 2143.01. As noted above, Applicant submits that the statements in the Office Action on page 6 in support of the proposed combination of Sun and Murata *et al.* are not based on the suggestion

of the desirability of the combination found in the documents themselves. Therefore, the statements represent mere subjective belief, and thus the Office Action fails to state a *prima facie* case of obviousness with respect to dependent claims 2-5, 8-9, 12, and 14.

In another example, new dependent claim 94 includes an assembly including a flip chip. Applicant can not find in either Sun or Murata *et al.* a teaching or suggestion of a flip chip.

For reasons analogous to those provided above and additional elements in the claims, Applicant submits that the Office Action fails to state a *prima facie* case of obviousness with respect to claims 2-5, 8-9, 12, and 14. Therefore, Applicant respectfully requests withdrawal of the rejections and reconsideration and allowance of claims 1-6, 8-10, 12, and 14. In addition, Applicant respectfully requests allowance of new claim 94.

Documents Cited but Not Relied upon for this Office Action

Applicant need not respond to the assertion of pertinence stated for the references cited but not relied upon by the Office Action since these references are not made part of the rejections in this Office Action. Applicant is expressly not admitting to this assertion and reserves the right to address the assertion should it form part of future rejections.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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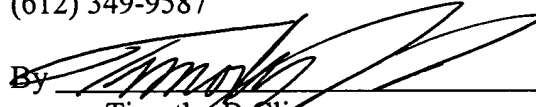
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 20 day of April, 2005.

JONATHAN FERGUSON

Name



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